



GB 00/1968

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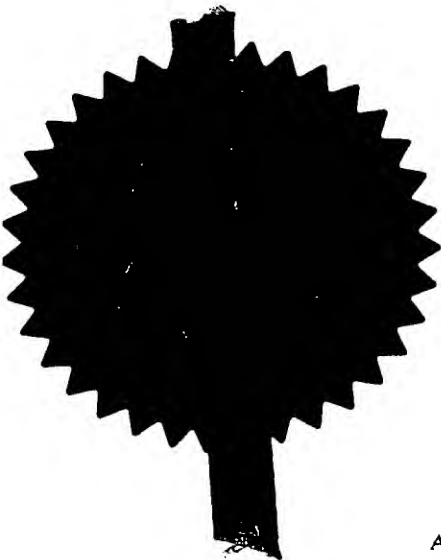
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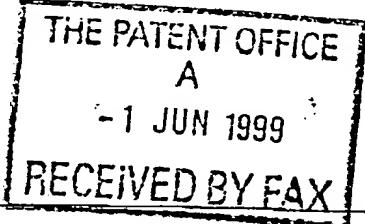
*Andrew Gersey*

Dated 22 June 2000



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P01/7700 0.00 - 9912652.6

1 JUN 1999

Your reference  
RMV/P95300

9912652.6

#### Notes

Please type, or write in dark ink using CAPITAL letters. A prescribed fee is payable for a request for grant of a patent. For details, please contact the Patent Office (telephone 071-438 4700).

Rule 16 of the Patents Rules 1990 is the main rule governing the completion and filing of this form.

2 Do not give trading styles, for example, 'Trading as XYZ company', nationality or former names, for example, 'formerly (known as) ABC Ltd' as these are not required.

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## Request for grant of a Patent Form 1/77

Patents Act 1977

### 1 Title of invention

1 Please give the title of the invention

MATERIAL FOR USE IN FLUID  
TRANSFER SYSTEM

### 2 Applicant's details

☐ First or only applicant

2a If you are applying as a corporate body please give:  
Corporate name

Country (and State of Incorporation, if appropriate)

2b If you are applying as an individual or one of a partnership please give in full:

Surname GASKARTH

Forenames JOHN ALEXANDER

2c In all cases, please give the following details:

Address  
LOW RIGG  
STAINSACRE  
WHITBY  
NORTH YORKSHIRE

7671365001

UK postcode YO22 4LP  
(if applicable)

Country UNITED KINGDOM

ADP number  
(if known)

**2d, 2e and 2f:**

*If there are further applicants  
please provide details on a separate  
sheet of paper.*

☐ **Second applicant (if any)**

**2d** If you are applying as a corporate body please give:

Corporate name

Country (and State of incorporation, if appropriate)

**2e** If you are applying as an individual or one of a partnership please give in full:

Surname

Forenames

**2f** In all cases, please give the following details:

Address

UK postcode  
(if applicable)

Country

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**3**

*An address for service in the United  
Kingdom must be supplied.*

*Please mark correct box*

**3 Address for service details**

**3a** Have you appointed an agent to deal with your application?

Yes ☒ No ☐ → go to 3b

↓  
*Please give details below*

Agent's name

URQUHART-DYKES & LORD

Agent's address

ST NICHOLAS CHAMBERS

AMEN CORNER

NEWCASTLE UPON TYNE

Postcode NE1 1PE

Agent's ADP number 00001644019

**3b:**

*If you have appointed an agent,  
all correspondence concerning  
your application will be sent to  
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address.*

**3b** If you have not appointed an agent please give a name and address in the United Kingdom to which all correspondence will be sent:

Name

Address

Postcode  
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(if known)

Daytime telephone  
number (if available)

#### 4 Reference number

**4 Agent's or applicant's  
reference number  
(if applicable)**

RMV/P95300

## 5 Claiming an earlier application date

5 Are you claiming that this application be treated as having been filed on the date of filing of an earlier application?

Yes ☐ No ☒ ➡ *go to 5*

***please give details below***

☐ number of earlier application or patent number

**filing date**

(day month year)

☐ and the Section of the Patents Act 1977 under which you are claiming:

15(4) (Divisional) ☐ 8(3) ☐ 12(6) ☐ 37(4) ☐

## 6

*If you are declaring priority from a PCT Application please enter 'PCT' as the country and enter the country code (for example, GB) as part of the application number.*

*Please give the date in all number format, for example, 31/05/90 for 31 May 1990.*

## 6 Declaration of priority

6 If you are declaring priority from previous application(s), please give:

Country of filing

Priority application number  
(if known)

Filing date  
(day,month,year)

7

The answer must be 'No' if:

- any applicant is not an inventor
- there is an inventor who is not an applicant, or
- any applicant is a corporate body.

8

Please supply duplicates of claim(s), abstract, description and drawing(s).

Please mark correct box(es)

9

You or your appointed agent (see Rule 90 of the Patents Rules 1990) must sign this request.

Please sign here →

A completed fee sheet should preferably accompany the fee.

## 7 Inventorship

7 Are you (the applicant or applicants) the sole inventor or the joint inventors?

Please mark the correct box

Yes ☒ No ☐

A statement of Inventorship on Patents Form 7/77 will need to be filed (see Rule 15).

## 8 Checklist

8a Please fill in the number of sheets for each of the following types of document contained in this application.

Continuation sheets for this Patents Form 1/77

Claim(s)

Description

Abstract

Drawing(s)

8

1

8b Which of the following documents also accompanies the application?

Priority documents (please state how many)

Translation(s) of Priority documents (please state how many)

Patents Form 7/77 - Statement of Inventorship and Right to Grant (please state how many)

Patents Form 9/77 - Preliminary Examination/Search

Patents Form 10/77 - Request for Substantive Examination

## 9 Request

I/We request the grant of a patent on the basis of this application.

Signed

Date 01/06/1999

(day month year)

Please return the completed form, attachments and duplicates where requested, together with the prescribed fee to:

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### MATERIAL FOR USE IN FLUID TRANSFER SYSTEM

The present invention relates to a material for use in a system for transferring fluid, and to a fluid transfer system incorporating such a material. The invention relates particularly, but not exclusively, to a material for use in a drainage and/or irrigation system.

Underground drainage/irrigation systems are known in which an underground pipe having slits, respectively carries water away from/to an area of ground to be drained or irrigated. Such systems suffer from the drawback that mud and silt can enter into the pipe and cause blockages, or the slits in the pipe can become blocked by debris.

When laying such a pipe considerable care is required in maintaining a constant gradient to allow the water to pass in or out. Therefore obstacles in the ground, such as rocks or tree roots, have to be avoided and the back filling of trenches dug to lay the pipes in must be undertaken with great care.

Care when back filling is also required as such pipes can become distorted, compressed or ruptured. This can lead to direct blockage, or to inconsistent drainage or irrigation and an increased likelihood of blockage occurring due to siltation as described above.

Such pipe systems cannot be located close to trees or hedges as the roots of such plants can infiltrate the pipes. Once within a pipe, the root system grows rapidly in the water rich environment and can quickly lead to blockages.

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A further problem associated with pipe systems is that as the diameter of a pipe is increased, the quantity of material required to construct a pipe of sufficient strength to protect against compression dramatically increases. This in turn significantly increases the cost of the pipe.

All such pipes can also succumb to compression forces from the surface, such as experienced from increasing heavy farm machinery, and are prone to collapse. This problem is accentuated around areas of most frequent use, such as gateways.

Preferred embodiments of the present invention seek to overcome the above disadvantages of the prior art.

According to an aspect of the present invention, there is provided a fluid transfer material for use in a system for transferring fluid, the fluid transfer material comprising:

at least one rubber material; and/or

at least one fibrous material; and

at least one thermoplastic material bonded thereto.

By providing a thermoplastic material bonded to at least one fibrous material and/or at least one rubber material, this provides the advantage of providing a fluid transfer material through which fluid can pass, but which prevents passage of larger particles such as stones or gravel, which could otherwise cause blockages in pipes.

At the same time, the fluid transfer material can be constructed with a relatively rigid open structure, which enables the fluid transfer material to be sufficiently strong and durable while still allowing fluid to pass therethrough. The rubber material is used to provide rigidity, and resilience



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to compressive forces. The fibrous material is provided to assist the rubber material in creating an open structure. In time the fibrous material may decay and further assist in creating an open structure.

At least one said rubber material may be shredded.

This provides the advantage of enabling the fluid transfer material to be formed into a large diameter, relatively solid, porous structure. By forming the material into a structure of large surface area in this way, the further advantage is provided of enabling the fluid flow through the material to be maximised, while at the same time enabling solid contaminants to be filtered. Furthermore, to create an increase in the overall size of the fluid transfer structure, without a decrease in strength of the structure, the above described embodiment of the present invention does not require an increase in material used in its construction, equivalent to that required in pipe systems.

At least one said rubber material may be rubber crumb.

In a preferred embodiment, at least one said rubber material may be recycled from tyres.

At least one said fibrous material may comprise straw.

At least one said fibrous material may comprise wood waste.

At least one said thermoplastic material may be recycled.

The use of the above waste or recycled materials provides the advantage of utilising low cost raw materials, while at the same time providing a use for many materials which present difficulties in recycling. The rubber material used may be reclaimed from car tyres which at present are costly to dispose of. Fibrous materials such as straw also present disposal

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problems, in particular linseed and rape straw which rot much more slowly than other straws. The thermoplastics may also be recycled, and mixed source thermoplastics may be used. The use of mixed source thermoplastics has the further advantage that unlike many conventional thermoplastic recycling techniques, which require a relatively high level of purity of recycled material, almost any thermoplastic can be added to the mixture to provide the bonding of the other materials.

These benefits of low cost raw materials provide the further advantage that the volume of the material to be used is not restricted by cost, thus enabling drainage to be carried out on heavy, wet land.

At least one said thermoplastic material may be shredded.

At least one said fibrous material may be inorganic.

In a preferred embodiment, the material is moulded.

Alternatively, the material may be extruded at elevated temperature.

According to another aspect of the present invention, there is provided a system for transferring fluid comprising:

a conduit for carrying fluid; and

a fluid transfer material as defined above, the fluid transfer material cooperating with said conduit for transferring fluid thereto and/or therefrom.

In a preferred embodiment, said conduit is a gutter arranged in use below an elongate length of said fluid transfer material.

The conduit may be an elongate pipe having means for enabling passage of fluid between the interior and exterior thereof,

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said pipe being at least partially surrounded by an elongate length of said fluid transfer material.

The means for enabling passage of fluid between the interior and exterior of the pipe may comprise one or more apertures in the pipe.

The pipe may have at least one slot arranged in an upper part thereof in use.

The pipe may be porous.

Such a system may be used as an alternative or supplementary to back filling of trenches dug to lay drainage/irrigation pipes in. Such a system has the advantage of protecting the pipe from compressive forces. The system can also filter and minimise the passage of solid contaminants in drainage water before they can be introduced to the pipe.

The system may be for drainage.

Alternatively, or in addition, the system may be for irrigation.

Preferred embodiments of the invention will now be described, by way of example only, and not in any limitative sense, with reference to the accompanying drawings, in which:-

Figure 1 is a schematic perspective view of a cross-section view of a drainage and/or irrigation system of a first embodiment of the present invention;

Figure 2 is a view, corresponding to Figure 1, of a system of a second embodiment of the invention;

Figure 3 is a view, corresponding to Figure 1, of a system of a third embodiment of the invention; and

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Figure 4 is a view, corresponding to Figure 1, of a system of a fourth embodiment of the invention.

Referring to Figure 1, an irrigation and/or drainage system 1 comprises a generally cylindrical pipe 2 having slots (not shown), the pipe 2 being surrounded by an elongate length of a fluid transfer material 3 formed from a moulded mixture of shredded thermoplastics, shredded rubber and organic and/or inorganic fibre. As can be seen from the Figure, the width of the length of material 3 is considerably greater in the region above the pipe 2 than in the vicinity of the pipe 2. This enables the material 3 to capture fluid from (or deliver fluid to) a large volume of ground.

Figure 2 shows a second embodiment of the irrigation and/or drainage system 11, which differs from the embodiment of Figure 1 in that the material 13 is of generally circular transverse cross section with the pipe 12 arranged at a lower part thereof.

Referring to Figure 3, a drainage and/or irrigation system 31 of a third embodiment comprises an elongate gutter 32 arranged below an elongate length of the fluid transfer material 33 described with reference to Figures 1 and 2 above and having the same shape as the material 3 of Figure 1. Similarly, the material 43 of the embodiment of Figure 4 has the same shape as the material 13 of figure 2.

Any of the above described embodiments of the present invention may be produced by moulding. A combination of the thermoplastics and at least one of the fibrous and rubber materials are heated to a temperature above the melt point of the dominant thermoplastic of the mixture, and mixed before being placed in a mould and allowed to cool and set. The cooling process can be speeded by the introduction of liquid nitrogen.

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The above described embodiments can also be produced by extrusion. Hopper fed, straight barrel, straight screw, in-line or cross-head extruders are suitable systems for producing such materials. The speed of production and pressure used within the extruder can be varied to produce various densities (ie more open or compact structure) of products for use in different circumstances and purposes. Again liquid nitrogen can be used to assist in the cooling process. Use of such an extrusion process will also tend to cause a proportion of the longer fibres, whether from the fibrous material or shreds of rubber, to align along the axis of the extrusion. When the extruded product is in the ground acting as drain or irrigation means, the direction of the fibres will tend to draw water along the drainage/irrigation system by a wicking process.

Where a cross-head extruder is used a line or rope may be introduced to the middle of the product profile. Netting may also be wrapped around the outside of the product to assist in the handling of the product once manufactured. The netting may be wrapped around the outside of the product either completely or at least partially covering it. Alternatively a sleeve of netting maybe introduced.

To form elongate gutter 32, shown in Figure 3, a sheet of thermoplastic is placed on the underside of the formed profile before it is cooled. The retained heat in the newly formed profile is sufficient to bond the thermoplastic to the profile. If there is not enough residual heat, addition heat can applied to assist with the bonding process.

It will be appreciated by persons skilled in the art that the above embodiments have been described by way of example only and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims. For example it will be appreciated by persons skilled in the art that fluid transfer systems with a high fibrous content (and

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low or zero rubber content) are suitable for use as absorbent materials for substances such as oils, and could therefore be formed into oil absorbent booms for spillage control.

It will also be appreciated by persons skilled in the art that such fluid transfer systems could be used as a rooting media for plants grown by hydroponic means.

It will be further appreciated that such fluid transfer systems could be formed into mats for laying under areas requiring intensive drainage and/or irrigation such as sports area including golfing greens.

1/1

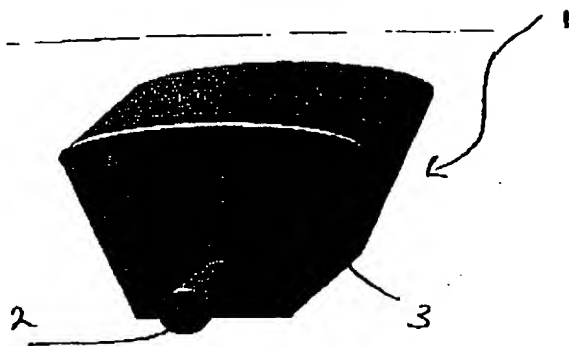


FIGURE 1

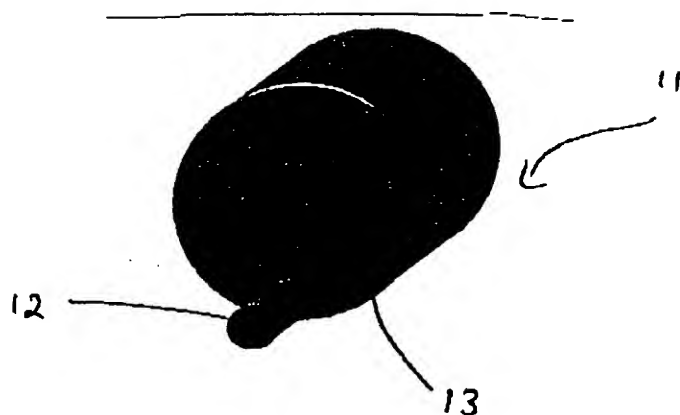


FIGURE 2

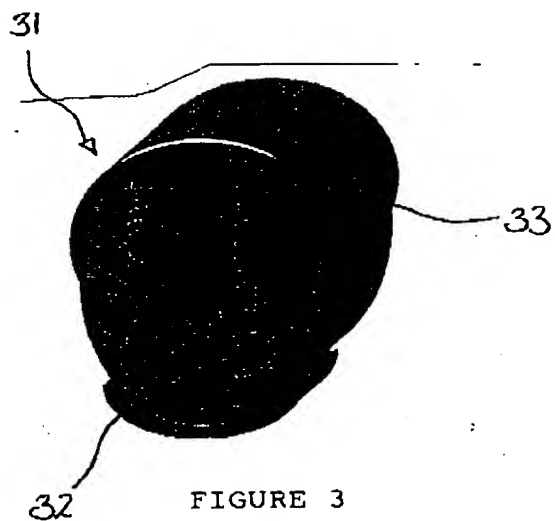


FIGURE 3

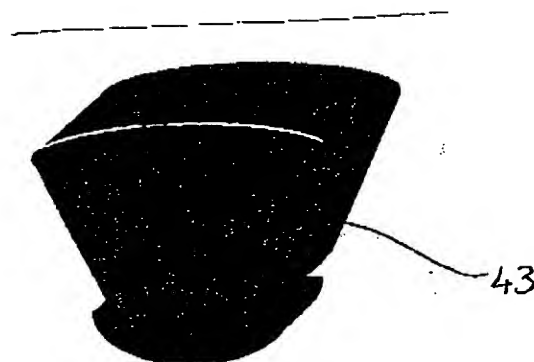


FIGURE 4

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